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REMARKS

This response is intended as a full and complete response to the non-final Office Action dated November 21, 2003. In that action the Examiner noted that claims 1-18 and 22-29 were pending and rejected. In view of the foregoing amendments and the following discussion, the Applicant submits that all of the pending claims are allowable. Therefore, please reconsider the pending claims and allow the subject application to issue.

I. REJECTION OF CLAIMS 1-14 AND 24-29 UNDER 35 U.S.C. §112

The Examiner has rejected claims 1-14 and 24-29 under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The rejection is based on the second clause of claims 1 and 24 containing an unclear statement.

In response, Applicant amends claims 1 and 24 to remove the unclear statement. The specific amendment, deletion of "in forming said information stream segments" corresponds to the understanding of the claims by the Examiner. The Examiner is thanked for treating claims 1 and 24 as he did.

II. REJECTION OF CLAIMS 1, 2, 10-13, 15, and 23-25 under 35 U.S.C. §103(a)

The Examiner has rejected claims 1, 2, 10-13, 15, and 23-25 U.S.C. §103(a) as being unpatentable over Tseng et al. (5,625,416) in view of Kupnicki et al. (US 4,742,544) and Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The Examiner's attention is directed to the fact that Tseng et al., Kupnicki et al., and Inoue (either singly or in any permissible combination) fail to disclose or suggest the invention as claimed in Applicant's independent claims. Specifically, Applicant's independent claims positively recite:

1. A method for securing an information stream comprising a sequence of image frames, said method comprising the steps of:
segmenting said information stream into a plurality of information stream

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segments having a first segment sequence, each of said information stream segments comprising a plurality of image frames;
compressing said image frames after said segmenting step by employing prediction-based compression;
re-sequencing said information stream segments to produce a re-sequenced information stream having a second segment sequence, said first segment sequence being related to said second segment sequence by an index;
and
encrypting said re-sequenced information stream and said index.
(emphasis added)

15. A method for recovering image frames from an information stream formed according to the securing method of claim 1, said method for recovering comprising the steps of:

recovering said index relating said second segment sequence to said first segment sequence;
decrypting said encrypted information stream segments to produce corresponding decrypted information stream segments;
re-sequencing, using said recovered index, said decrypted information stream segments; and
decompressing, after said re-sequencing step using a prediction-based decompression process associated with said compression process, said compressed image frames included within said decrypted information stream segments. (emphasis added)

23. A method for recovering an information stream having a first segment sequence from an encrypted re-sequenced information stream having a second segment sequence, said method comprising the steps of:

recovering an index relating said second segment sequence to said first segment sequence;
decrypting said encrypted information segments to form respective decrypted information segments;
re-sequencing, using said recovered index, said decrypted information segments to form an information stream comprising a plurality of image segments arranged according to said first segment sequence; and
decompressing after said re-sequencing step a plurality of image frames forming each of said information stream segments by employing prediction-based decompression. (emphasis added)

24. An apparatus comprising:

a segmentation module, for segmenting an information stream into a plurality of information stream segments, said information stream segments arranged according to a first segment sequence, each of said information stream segments comprising a plurality of image frames;
a compression module, for compressing said image frames after said

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segmenting step by employing prediction-based compression;
a re-sequencing module, for re-arranging according to a second segment sequence, said information stream segments including said compressed image frames, said first segment sequence being related to said second segment sequence by an index; and
an encryption module, for encrypting said re-sequenced information stream segments and said index. (emphasis added)

Applicant's invention is directed to a method and apparatus for securing an information stream by dividing that stream into a collection of segments that are then compressed using prediction based compression, rearranged in order in accord with an index, and then encrypted along with the index. In one embodiment of the invention, an input information stream is divided into a collection of information segments, the individual segments are compressed using prediction based compression, then arranged in a non-standard (i.e., scrambled) manner to produce a scrambled collection of information segments and an associated index table that is suitable for rearranging the collection of information segments into a standard (i.e., unscrambled) order, and then the scrambled collection of information segments and the associated index table are both encrypted. Other embodiments relate to recovering the input information stream.

The present invention protects the information stream from pirates or unauthorized subscribers using multiple layers of protection. Segmentation followed by compression of the segments using predictive based compression provides a first layer of protection. Segmenting and compressing the segments produces a different compressed information stream than if the information stream was compressed in the normal manner. Re-arranging the compressed individual segments provides another layer of security. Encrypting provides yet another layer. Finally, encrypting an index that is used to re-order the scrambled, compressed, and encoded individual segments provides still another layer of security.

In contrast, the prior art relied on by the Examiner fails to teach or even suggest the subject invention. Tseng et al. teaches only segmenting and compressing signals (using predictive compression according to MPEG standards). Tseng et al. fails to disclose an index, re-ordering of compressed segments, or encryption. Kupnicki et al. discloses segmenting and then re-ordering of the segmented signals, along with

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inserting re-ordering information into the scrambled video data. That re-ordering information is recovered using KEY codes. Kupnicki et al. not only fails to disclose compression, it also fails to disclose encrypting re-ordered data and encrypting re-ordering information. In Kupnicki et al., the re-ordering is the encryption, no other encryption is taught or suggested. Kupnicki et al. fails to include an encrypted index because the pre-arranged KEY codes negate the need for the index. Finally, as Inoue merely discloses standard encryption and decryption techniques, Inoue does not teach segmentation followed by predictive based compressed, followed by re-ordering and then encryption of the re-ordered data (and index).

The principles of the present invention relate to an integrated scheme that protects information. Tseng et al. relates to different scheme, while Kupnicki et al. relates to yet another different scheme. The November 21, 2003 Office Action merely identifies prior art references that may individually relate to specific elements of the present invention. Yet the subject invention is comprised of all of the elements taken as a whole. In fact, the pending claims appear to have been used as a roadmap by the Examiner to find individual references that disclose individual elements, and then as a construction diagram to order those individual references to support the rejection. Such is impermissible. Nowhere does the Examiner discuss the pending claims as a whole. The relied upon prior art, when taken individually or in any permissible combination, do not provide any suggestion or motivation to combine their teachings to arrive at the subject invention.

Neither Kupnicki et al. nor Inoue disclose or suggest "compressing image frames using predictive based decompression". In contrast to Applicant's invention, Inoue discloses, that "[t]he video signal which is transmitted from the video, audio, and digital audio signal transmission device to the scramblers is of NTSC format, and scrambled by line shuffling, using frame memory" (column 4 lines 7-11). The Inoue arrangement rearranges video lines without compressing the video lines. That is also what Kupnicki et al. teaches. Thus, both Kupnicki et al. and Inoue teach away from the use of compression.

Since the references, either singly or in permissible combination, fail to disclose

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or suggest the invention defined by independent claims 1, 15, 23, and 24, it is respectfully submitted that those claims are allowable. Furthermore, as claims 2, 10-13, and 25 depend from those allowable claims and recite additional limitations those claims are also allowable. Therefore, Applicant requests withdrawal of the rejections of claims 1, 2, 10-13, 15, and 23-25.

III. REJECTION OF CLAIMS 3, 6, 16, and 26 under 35 U.S.C. §103(a)

The Examiner has rejected claims 3, 6, 16, and 26 as being unpatentable over Tseng et al. (5,625,416) in view of Kupnicki et al. (US 4,742,544) and Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The foregoing has described Tseng et al., Kupnicki et al., and Inoue and how independent claims 1, 15, and 23 are allowable over those references. Claims 3, 6, 16, and 26 depend from those independent claims, and thus include all of the limitations of those independent claims and recite additional limitations. Consequently, claims 3, 6, 16, and 26 are also allowable. Applicant requests withdrawal of the rejections of claims 3, 6, 16, and 26.

IV. REJECTION OF CLAIMS 4, 5, 17, 27, and 28 under 35 U.S.C. §103(a)

The Examiner has rejected claims 4, 5, 17, 27, and 28 as being unpatentable over Tseng et al. (5,625,416) in view of Kupnicki et al. (US 4,742,544) and Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The foregoing has described Tseng et al., Kupnicki et al., and Inoue and how independent claims 1, 15, and 23 are allowable over those references. Claims 4, 5, 17, 27, and 28 depend, either directly or indirectly, from those independent claims, and thus include all of the limitations of the independent claims and recite additional limitations. Consequently, claims 4, 5, 17, 27, and 28 are also allowable. Applicant requests withdrawal of the rejections of claims 4, 5, 17, 27, and 28.

V. REJECTION OF CLAIMS 7, 8, and 29 under 35 U.S.C. §103(a)

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The Examiner has rejected claims 7, 8, and 29 as being unpatentable over Tseng et al. (5,625,416) in view of Kupnicki et al. (US 4,742,544) and Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The foregoing has described Tseng et al., Kupnicki et al., and Inoue and how independent claims 1, 15, and 23 are allowable over those references. Claims 7, 8, and 29 depend, either directly or indirectly, from those independent claims, and thus include all of the limitations of the independent claims and recite additional limitations. Consequently, claims 7, 8, and 29 are also allowable. Applicant requests withdrawal of the rejections of claims 7, 8, and 29.

VI. REJECTION OF CLAIM 9 under 35 U.S.C. §103(a)

The Examiner has rejected claim 9 as being unpatentable over Tseng et al. (5,625,416) in view of Kupnicki et al. (US 4,742,544) and Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The foregoing has described Tseng et al., Kupnicki et al., and Inoue and how independent claim 1 is allowable over those references. Claim 9 depends from that independent claim, and thus claim 9 includes all of the limitations of that independent claim and recites additional limitations. Consequently, claim 9 is allowable. Applicant hereby requests withdrawal of the rejections of claim 9.

VII. REJECTION OF CLAIM 14 under 35 U.S.C. §103(a)

The Examiner has rejected claim 14 as being unpatentable over Tseng et al. (5,625,416) in view of Kupnicki et al. (US 4,742,544) and Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The foregoing has described Tseng et al., Kupnicki et al., and Inoue and how independent claim 1 is allowable over those references. Claim 14 depends from that independent claim, and thus claim 14 includes all of the limitations of that independent claim and recites additional limitations. Consequently, claim 14 is allowable. Applicant hereby requests withdrawal of the rejections of claim 14.

VIII. REJECTION OF CLAIMS 18 and 22 under 35 U.S.C. §103(a)

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The Examiner has rejected claims 18 and 22 as being unpatentable over Tseng et al. (5,625,416) in view of Kupnicki et al. (US 4,742,544) and Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The foregoing has described Tseng et al., Kupnicki et al., and Inoue and how independent claim 15 is allowable over those references. Claims 18 and 22 depend from independent claim 15, and thus include all of the limitations of that independent claim and recite additional limitations. Consequently, claims 18 and 22 are also allowable. Applicant requests withdrawal of the rejections of claims 18 and 22.

IX. REJECTION OF CLAIMS 15 and 23 under 35 U.S.C. §103(a)

The Examiner has rejected claims 15 and 23 as being unpatentable over Oshima et al. (WO98/27553, or US 6,266,299) in view of the Microsoft Press *Computer Dictionary* and in view of Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

Independent claims 15 and 23 recite:

15. A method for recovering image frames from an information stream formed according to the securing method of claim 1, said method for recovering comprising the steps of:

recovering said index relating said second segment sequence to said first segment sequence;

decrypting said encrypted information stream segments to produce corresponding decrypted information stream segments;

re-sequencing, using said recovered index, said decrypted information stream segments; and

decompressing, after said re-sequencing step using a prediction-based decompression process associated with said compression process, said compressed image frames included within said decrypted information stream segments. (emphasis added)

23. A method for recovering an information stream having a first segment sequence from an encrypted re-sequenced information stream having a second segment sequence, said method comprising the steps of:

recovering an index relating said second segment sequence to said first segment sequence;

decrypting said encrypted information segments to form respective decrypted information segments;

re-sequencing, using said recovered index, said decrypted information segments to form an information stream comprising a plurality of image

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segments arranged according to said first segment sequence; and decompressing after said re-sequencing step a plurality of image frames forming each of said information stream segments by employing prediction-based decompression. (emphasis added)

The November Office Action references Figure 34 of Oshima et al. as showing an MPEG encoder 43, a scrambler 45, and an encoding key 44. That Office Action then provides that MPEG anticipates prediction-based compression, and that the key 44 corresponds to the index recited in the rejected claims 15 and 23. Finally, the November Office Action relies on the definition of scrambler for supporting a re-ordering of a signal sequence.

However, any reliance on the key 44 being equivalent to an index is misplaced. In pending claims 15 and 23, the index is first recovered and then used to re-sequence decrypted data. In contrast, the key 44 is a system operator encryption key that is used to control the scrambling. US 6,266,299 does not discuss sending that key, encrypting that key, or decrypting that key. This is assumed to be because a user has a corresponding key. Furthermore, a user need not use the same key as used in encrypting (just a key that can support decryption). Furthermore, as recited in claims 15 and 23, the index is used after decryption not for decryption. This is because the information protection scheme recited in claims 15 and 23 is fundamentally different than the protection scheme in Oshima et al.

Inoue does nothing to close the substantial gap between the invention defined by claims 15 and 23 and Oshima et al. While Inoue discusses encryption and decryption, and while the Examiner correctly states that encryption helps protect data, the invention recited by claims 15 and 23 includes an encrypted index that is not found in Oshima et al. or Inoue, the use of that index to re-sequence decrypted data (not to decrypt), and decompression of the re-sequenced data.

In view of the foregoing, independent claims 15 and 23 are allowable over Oshima et al., the Microsoft Press *Computer Dictionary* and Inoue, when taken alone or in any permissible combination. Applicant hereby requests withdrawal of the rejections of claims 15 and 23.

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X. REJECTION OF CLAIM 16 under 35 U.S.C. §103(a)

The Examiner has rejected claim 16 as being unpatentable over Oshima et al. (WO98/27553, or US 6,266,299) in view of the Microsoft Press *Computer Dictionary* and in view of Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The foregoing has described how independent claim 15 is allowable over Oshima et al. (WO98/27553, or US 6,266,299), Microsoft Press *Computer Dictionary*, and Inoue (US 5,195,134). Claim 16 depends from that independent claim, and thus includes all of the limitations of that independent claim. Consequently, claim 16 is allowable. Applicant hereby requests withdrawal of the rejections of claim 16.

XI. REJECTION OF CLAIM 17 under 35 U.S.C. §103(a)

The Examiner has rejected claim 17 as being unpatentable over Oshima et al. (WO98/27553, or US 6,266,299) in view of the Microsoft Press *Computer Dictionary* and Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The foregoing has described how independent claim 15 is allowable over Oshima et al., Microsoft Press *Computer Dictionary*, and Inoue. Claim 17 depends from that independent claim, and thus claim 17 includes all of the limitations of that independent claim. Consequently, claim 17 is allowable. Applicant hereby requests withdrawal of the rejections of claim 17.

XII. REJECTION OF CLAIMS 18 and 22 under 35 U.S.C. §103(a)

The Examiner has rejected claims 18 and 22 as being unpatentable over Oshima et al. (WO98/27553, or US 6,266,299) in view of the Microsoft Press *Computer Dictionary* and Inoue (US 5,195,134). Applicant respectfully traverses this rejection.

The foregoing has described how independent claim 15 is allowable over Oshima et al., Microsoft Press *Computer Dictionary*, and Inoue. Claims 18 and 22 depend from that independent claim, and thus claims 18 and 22 include all of the limitations of that independent claim. Consequently, claims 18 and 22 are allowable. Applicant hereby requests withdrawal of the rejections of claims 18 and 22.

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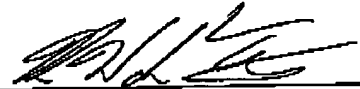
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Conclusion

Thus, the Applicant submits that all of pending claims now fully satisfy the requirements of 35 U.S.C. §112 and 35 U.S.C. §103. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of a final action the Applicant requests that the Examiner telephone Mr. Kin-Wah Tong, Esq. or John M. Kelly at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

2/23/04
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